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James Hardie Technology Limited
Europa House
Harcourt Centre, Harcourt Centre
Dublin, DUBLIN 2
IRELAND

EXAMINER	
ROBINSON, LAUREN E	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/551,873	ZARB ET AL.	
	Examiner	Art Unit	
	LAUREN ROBINSON	1784	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *04 January 2011*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *38,40,43,44,47,48,50-54,56,58,65,69-71 and 76-114* is/are pending in the application.

4a) Of the above claim(s) *38,40,43,44,47,48,50-54,56,58,65 and 69-71* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *76-114* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *1/2011*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 79 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 79 recites the sealer on at least one of the two major surfaces of claim 76 is radiation curable. However, claim 76 already recites the sealer on both major surfaces being radiation curable.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 78, 113 and 114 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 78 and 113 are rejected for reciting the sealer on all surfaces of the product. Specifically, these claims depend on claims 76 and 111 which recite the product comprising a sealer. However, claims 78 and 113 appear to suggest that the sealer does not comprise the product but instead is placed on the outer surface of the product making the claim unclear.

For purposes of applying prior art, the claims are interpreted to be the sealer covering all surfaces of the cement within the product and not on a product already comprising a sealer.

Claim 114 is rejected for being dependent on claim 113.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 111-113 and 114 are rejected under 35 U.S.C. 103(a) as being obvious over DeFord et al. (US Pub. 2002/0139082) as applied to claim 76 as evidenced by Absolute Astronomy (http://www.absolute astronomy.com/topics/Perlite).

Regarding claim 111: DeFord et al. teach an engineered (constructed) fiber reinforced cement composite product (abstract, 0031, 0033-0092 especially 0079, 0086-0087).

The product comprises a first major surface (Figures, 0031, 0079, 0086-0087) and a multiple layer facing (ie: interlayers and outer facing layer) can be thereon (0035, 0095, 0099).

DeFord does not explicitly teach the surface having reduced propensity to differential carbonation or said reduction from a carbonation reducing sealer and a keycoat. However, the materials form moisture resistance, barrier to water permeability, etc. on the surface (0017, 0092-0100, 0184). As DeFord's facing materials are considered to seal and cover the surface from the above conditions, one having ordinary skill would expect that the mere presence of each layer will reduce speed of carbonation (Beers Law) on the surface and be a laminate facing carbonation reducing

sealer itself (carbonation reducing interlayer /carbonation reducing outer "keycoat"). Specifically, components in the environment known in the art to cause carbonation would have to travel through the sealers before reaching the cement and therefore, the sealers would be reducing the speed of carbonation. Additionally, DeFord's materials comprise acrylic resin (0045) which is applicants' carbonation reducing material.

Further, applicants disclose that materials forming an interpenetrating network in the surface will cause the material to be differential carbonation reducing, reducing propensity for different carbonation on the surface. DeFord teaches that the facing materials intermingle (interact) with the surface to form a mutually inter-penetrating bonding interface network by co-curing the surface and facing together (0017, 0098-0097). As this inter-penetrating interface will include an overlapping region comprising the facing material commingled with the surface material, DeFord's facing layers will form an inter-penetrating network *in* the surface. As DeFord's laminate appears to meet applicants' characteristics, one having ordinary skill would expect it to have the same capabilities of the layers being carbonation reducing and providing the first major surface with reduced propensity to differential carbonation as claimed absent an evidentiary showing to the contrary

DeFord teaches the product having 10 to 80 % cement and 0 to 80 % silica filler (0039-0044) in the facing material surface and 10 to 100% cement and 0 to 80% perlite (perlite is 70 to 75% silica as evidenced by absoluteastronomy.com) filler (0081-0087) in the core. As the facing and core include cement to silica ratios overlapping applicants', one having ordinary skill would expect the overall product to also include a cement to

silica ratio overlapping applicants. It would have been obvious to one having ordinary skill in the art at the time of invention to choose any amount of cement and silica, thereby any ratio thereof, within DeFord's product to obtain suitable cement product.

Regarding claims 112-113 and 114: DeFord teaches the process of partially curing curable materials, applying materials and then fully curing allows for enhanced bonding (0093-0096). Therefore, in the application of multiple sealer coats, applicants' claimed processing would have been obvious within DeFord to obtain desired bonding.

DeFord's facing sealer is applied to all surfaces (0112-0121) and is comprised of acrylic, etc. which is what applicants' disclose as their radiation curable sealer.

4. Claims 111-113 and 114 are rejected under 35 U.S.C. 103(a) as being obvious over Honda et al. (JP 2001-335385) in view of DeFord (US Pub 2002/0139082) as evidenced by Absolute Astronomy (http://www.absolute astronomy.com/topics/Perlite).

Regarding claim 111: Honda teaches an engineered (constructed) fiber reinforced cement product having a first major surface (0008-0010, Figures).

Honda does not explicitly recite the surface having reduced propensity to differential carbonation reduced by application of a carbonation reducing sealer and key coat. However, the examiner notes that this reduced propensity is disclosed by applicants to be a result of a carbonation reducing sealer interacting with the cement and forming an interpenetrating network within the cement.

In the instant case, Honda teaches a sealer on the first major surface (0008) and one having ordinary skill would expect that a material forming a seal and blocking environmental conditions from reaching another material similar to that taught by Honda

would have some degree of carbonation reduction (Beers Law). Therefore, Honda's sealer on the first major surface is considered carbonation reducing. Additionally, Honda teaches that the sealer aids in prevention of carbonation (0003) making it carbonation reducing.

Honda does not explicitly disclose the sealer and cement interacting to form an inter-penetrating network. However, it is well known in the art that every material has some degree of porosity and Honda applying their sealers to a cement would cause one having ordinary skill to expect that the sealers would at least penetrate (interact with) the cement to some extent thereby forming an inter-penetrating network. Additionally, Honda is teaching their fiber reinforced cement is made using an aqueous slurry comprising cement, filler, powder, etc. which is then dried (0017) and according to DeFord, fiber reinforced cement made similarly (DeFord 0037-0055) have at least some porosity large enough to be penetrated (DeFord 0100). Therefore, one having ordinary skill would reasonably expect Honda's sealers to penetrate (interact) with the cement board and form an inter-penetrating network into the cement absent an evidentiary showing to the contrary.

Honda does not teach a key coat. However, an additional coating is as claimed is considered duplication of parts. For instance, one having ordinary skill in the art of coatings would know that multiple coats would be desirable in order to increase thickness, coverage, strength, repair chipped surfaces, etc.. For example, much like painting a wall, often more than one coat of the same material is necessary in order to obtain desired coverage and thickness. In the instant case, as Honda's surface sealer

on the face is for reducing carbonation and weathering, one having ordinary skill would desire enough coverage to obtain prevention of carbonation but also increasing the number of coats will desirably increase the thickness of the carbonation barrier. Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to modify Honda to include applying the acrylic surface sealer in multiple coats to obtain desired coverage, thickness, etc. thereby desired level of carbonation prevention

Honda fails to teach the cement to silica ratio with the porosity of the overall product. However, DeFord teaches their cement products being desirable for lighter weight and durable building products desired in the art (0003-0017, 0077). The cement includes facings having 10 to 80 % cement and 0 to 80 % silica filler (0039-0044) on both surfaces of a core and 10 to 100% cement and 0 to 80% perlite (perlite is 70 to 75% silica as evidenced by absoluteastronomy.com) filler (0081-0087) in the core. As each of the facings and core include cement to silica ratios overlapping applicants', one having ordinary skill would expect the *overall product* to also include a cement to silica ratio overlapping applicants. It would have been obvious to one having ordinary skill in the art at the time of invention to choose any amount of cement and silica, thereby any ratio thereof, within DeFord's product to obtain suitable cement product.

Also, the product comprising the facings (sealers) and core have a core porosity of 10 to 90% or more (0077). DeFord does not explicitly teach the level of porosity provided by the facings (sealers) to provide an overall product porosity but DeFord's teaches the cement being substantially core with fiber skins thereon. The core has a

porosity of 10 to 90% and fiber skins have closing porosity (not substantially porous) (DeFord 0003-0017, 0077). As DeFord suggest that the majority of the cement is core and the core obtains almost all the product porosity, one having ordinary skill would take DeFord's teaching to be indicating a cement product porosity of about 10 to 90%. Additionally, even in the instance it is determined that the facings have some degree of porosity, as they are thin and do not form a substantial part of the product, one having ordinary skill would not expect the porosity to change much, if at all, from 10 to 90%. This range overlaps applicants' range and it would have been obvious to one having ordinary skill to choose any porosity in the above range to obtain desired cement weight.

Honda and DeFord teach cements for building products and as DeFord indicates their light cement being preferable, it would have been obvious to one having ordinary skill in the art at the time of invention to modify Honda to include the cement of DeFord in order to obtain a light and durable building product.

Regarding claims 112-113 and 114: Honda fails to teach the additional coating applied on the carbonation reducing sealer before the sealer is fully cured or the carbonation reducing sealer on all surfaces of the product.

However, Honda teaches that the sealers are used for weathering prevention (0001-0010) and it is known and desired in the art to obtain weathering resistance on all surfaces of cement. For example, DeFord teaches weather resistant facings on all surfaces of a cement core board (Figure 7D, 0112 and 0121)

Honda and DeFord disclose analogous inventions related to weather resistant materials on a cement board. Although Honda and DeFord teach differing weather resistant materials, DeFord is clearly teaching that it is beneficial to obtain a weather resistant material on all surfaces. Therefore, one having ordinary skill would find it beneficial to place Honda's resistant material on all surfaces of their cement core. It would have been obvious to one having ordinary skill in the art at the time of invention to modify Honda to include the weather resistant sealer on all surfaces of the cement in order to provide enhanced weathering prevention.

DeFord also teaches that partially curing a weather resistant material, applying another material and then fully curing the overall product allows for enhanced bonding (DeFord 0093-0096). While Honda's and DeFord's materials differ, the concept of enhanced bonding would be well desired in the art and as both teach curable weather resistant materials on similar cement, one having ordinary skill would have found DeFord's multiple curing process to be obvious within the two layers of Honda. It would have been obvious to one having ordinary skill in the art at the time of invention to modify Honda to include partially pre-curing the sealer, applying the key coat and then finally curing the overall product to enhance bonding between materials.

Honda's, sealer is acrylic, etc. which is the same as applicants. Therefore, it would be expected to meet a radiation curable sealer.

5. Claims 76-84, 86-88, 92-100, 106-109 and 110 are rejected under 35 U.S.C. 103(a) as being obvious over Yonekawa (JP 05/287234) in view of Honda et al. (JP 2001-335385).

Regarding claims 76-81 and 82: Using the human English translation, Yonekawa teach an engineered (constructed) cement product (0001). The product comprises a cement body (0001, examples) and a sealer applied to a first major surface of the cement body (0007-0010). The sealer is an acrylic sealer (0011-0012) and as this is what applicants disclose as a radiation curable sealer, curable in the infrared (thermally cured), etc., The sealer is polymerically cross-linked. The cement and the sealer interact with one another to form an interpenetrating network extending into the surface of the cement (0007-0010).Yonekawa does not explicitly teach the sealer being "carbonation reducing' or the inter-penetrating network is to reduce differential carbonation and control carbonation gradients in the cement.

However, as the material forms a seal and blocks environmental conditions from reaching another material, it would be expected to have some degree of carbonation reduction. Additionally, Yonekawa teaches the sealer including acrylic resins (0011) which the same as applicants' carbonation reducing sealer material (see applicants' claim 82). Applicants also disclose that the sealer forming an inter-penetrating network similar to Yonekawa results in carbonation reduction. Further, the examiner also points out that Yonekawa teaches the sealer is a neutralization and carbon dioxide reducing sealer (0004, 0009, examples) and it is known that without carbon dioxide, there will be no carbonation clearly evidenced by Honda (Honda 0003). Therefore, Yonekawa's sealer reducing carbon dioxide will result in the sealer being a carbonation reducing sealer.

The limitation of the inter-penetrating network to reduce differential carbonation and control gradient carbonation is intended use and Yonekawa's product only has to be capable of the claimed use. As Yonekawa's inter-penetrating network seems to be the same as claimed, one having ordinary skill would expect it to have the same capabilities absent an evidentiary showing to the contrary. Additionally, Yonekawa clearly teaches that the sealer and inter-penetrating network is meant to reduce carbon dioxide in the cement (0009). As this is considered to reduce carbonation for reasons above, it is expected that the network will reduce differential carbonation thereby control it in the claimed manner.

Yonekawa fails to teach the cement being fiber reinforced having a first and second major surface. However, Honda teaches that reducing carbon dioxide on fiber reinforced cement boards having first and second opposing surfaces is beneficial for sheathing, wall board, etc. (0003, 0008-0010). Yonekawa and Honda disclose analogous inventions related to sealers on cement for reducing carbon dioxide effects. As Honda indicates using a fiber reinforced cement is beneficial for the carbon dioxide environmental conditions, it would have been obvious to one having ordinary skill in the art at the time of invention to modify Yonekawa to include the cement being fiber reinforced in order to obtain a stable sealed cement sheathing and wall board products.

Yonekawa fails to teach the thickness of the sealer but the examiner notes that thickness is result effective which is known to change physical properties such as strength, etc. One having ordinary skill would know that the thickness can be optimized to any value and through routine experimentation, desired results can be obtains.

Additionally, Yonekawa is teaching that their sealer composition is used to replace typical acrylic compositions used as sealers for surface enhancement, etc. of cement. One having ordinary skill would reasonably expect that since Yonekawa' is only replacing the composition of typical acrylic sealers, that the physical structure such as thickness, etc. would still be expected to be similar. Specifically, Honda teaches that typical acrylic sealers used for surface enhancement of cement are known to have thicknesses of 25 to 35 microns (Honda 0001-0005, 0018). Therefore, obtaining a thickness of Yonekawa's sealer being 25 to 35microns would be within routine experimentation. It would have been obvious to one having ordinary skill in the art at the time of invention to modify Yonekawa to optimize the sealer thickness to any value including 25 to 35 microns in order to obtain a desired sealer for cement.

Yonekawa fails to teach the above sealer being applied to first and second surfaces but the examiner notes that this is duplication of parts which provides no patentable weight unless a new and unexpected result occurs. Specifically, one having ordinary skill would know that applying the carbon dioxide sealer to all major surfaces of the cement board, the effect can be provided to all said surfaces. Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to modify Yonekawa to include the sealer on the first and second major surfaces of the cement board in order to impart carbon dioxide reduction on all surfaces.

Regarding claims 83-84, and 86: Yonekawa's sealer includes silanes (0040) which is applicants' claimed adhesion promoting formulation. As the silane forms part of the whole sealer, it corresponds to an "integral" adhesion promoting formulation. As the

formulation "to enhance bonding of a topcoat" is intended use, Yonekawa's product only has to be capable of the claimed use. In the instant case, as the adhesion formulation is the same as applicants', it would be considered to function as claimed.

Yonekawa duplicating the sealer on all surfaces corresponds to the sealers being substantially the same formulation.

Regarding claims 87-88: Yonekawa does not disclose a separate keycoat adapted to enhance bonding of a topcoat covering at least one of the sealed faces or the sealer being applied in multiple coats but the examiner notes that this is just duplication of Yonekawa's sealer which provides no patentable weight.

Regarding claim 88, one having ordinary skill in the art of coating would know that multiple coats of the sealer would be desirable in order to increase thickness, coverage, strength, repair chipped surfaces, etc.. Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to modify Yonekawa to include applying the acrylic surface sealer in multiple coats to obtain desired coverage, thickness, etc. thereby desired level of carbonation prevention.

Regarding claim 87, applying Yonekawa's acrylic sealer in multiple coats will necessarily at least provide a first acrylic sealer coat and a second acrylic sealer coat (key coat) covering the first. As acrylic is the same as applicants' disclosed bonding enhancement formulation, it would be expected by one having ordinary skill that this second coating (key coat) will enhance bonding of a top coat if applied.

Regarding claims 92-93 and 94: The sealer is polymerically cross-linked and is carbon dioxide resistant. This indicates their sealer will be cross-linked sufficiently to impede

migration of carbon dioxide. Also, as the acrylic sealer is the same material as claimed by applicants', it would be expected to be flexible in the cured state as claimed.

Regarding claim 95: Applicants' claim 95 limitation that one or more of the sealer and physical structure of a cured product are selected "to reduce propensity for carbonation" is intended use and the sealer and/or structure of Yonekawa only has to be capable of the claimed use. As Yonekawa's sealer and the structure are the same as claimed, it would be capable of reducing carbonation in the product.

Regarding claims 96-99 and 100: Yonekawa including the cement board of Honda obtains a cement product comprising 35 to 60wt% cement and 20 to 60 wt% silica (Honda 0010) which provides for cement to silica ratios overlapping applicants' claimed ranges. It would have been obvious to one having ordinary skill in the art at the time of invention to choose any cement to silica ratio provided by Honda's content ranges in order to obtain a desired cement product.

Regarding claims 106-109 and 110: Claims 106 and 107 are product by process claims and as long as Yonekawa's product meets the product claimed, the claims are met. In the instant case, as Yonekawa's modified structure is the same as applicants', it is expected to meet the product of claims 106 and 107.

Also, Yonekawa including the cement of Honda is the structure of a rectangular sheathing sheet and the entire structure surface is coated with the sealer. Claims 108 and 110 are intended use claims as they recite the sheet being used for an external cladding and the used of each surface of the cement and the prior art product only has to be capable of the use. As Yonekawa's structure is the same as claimed, it is

expected to be capable of the same use. Additionally, a sheathing (ie: siding) as now in Yonekawa is known in the art to be used as exterior cladding wherein one surface is mounted inward on a wall and the other is exposed to an external environment, Yonekawa's structure meets the claims.

6. Claims 85, 89-91, 101-104 and 105 are rejected under 35 U.S.C. 103(a) as being obvious over Yonekawa (JP 05/287234) and Honda et al. (JP 2001-335385) as applied to claim 76, in view of DeFord (US Pub 2002/0139082).

Regarding claim 85: Yonekawa does not include the sealer on at least the first and second major surfaces having different formulations. However, DeFord teaches that the same weather resistant layer can be applied to all cement surfaces similar to above or one can add weather resistant layers on all surfaces with the first and second major surfaces being different depending on desired weathering results. This indicates that although Yonekawa was modified to duplicate the weather resistant sealer on all surfaces, DeFord's teaching provides suggestion that the weather resistant sealer of Yonekawa can still be applied to all surfaces as in claim 76 but the formulations can be made different on the first and second surface as in claim 85.

Additionally, it would be known how to obtain this different formulation as Yonekawa teaches listings of different compounds and ranges of materials which are suitable and one having ordinary skill would know to optimize the material choice and content in each layer to obtain any desired differing formulations. Therefore, it would have been obvious to one having ordinary skill at the time of invention to modify

Yonekawa to include making the sealer on the first and second surfaces different formulations to obtain desired weathering.

Regarding claims 89-90 and 91: Yonekawa fails to teach the sealer cured in multiple stages but according to DeFord, partially curing a weather resistant material, applying said partially cured material to a cement and then fully curing the overall product allows for enhanced bonding between said material and cement (DeFord 0093-0096).

While Yonekawa's and DeFord's weather resistant materials differ, the concept of enhanced bonding would be well desired in the art and as both teach curable weather resistant materials on similar cement, one having ordinary skill would have found DeFord's multiple curing process to be obvious within Yonekawa. It would have been obvious to one having ordinary skill in the art at the time of invention to modify Honda to include partially pre-curing the sealer, applying the sealer to the cement and then finally curing the overall product to enhance bonding between materials.

Yonekawa fails to teach the application of another coating on the sealer on at least one of the faces and then obtaining multiple curing steps for increased bonding as claimed but as above, an additional coating is duplication of parts which is obvious to enhance thickness and coverage and multiple curing steps as claimed is beneficial in enhancing bonded. Therefore, it would have been obvious to one having ordinary skill in the art at the time of invention to duplicate the sealer and add multiple coats (ie: atleast the first sealer and then a second sealer corresponding to the claimed keycoat and topcoat) thereon in order to increase thickness and full coverage and partial curing occurs prior to full curing in order to enhance bonding of materials.

Regarding claims 101-102 and 103: Yonekawa includes the cement of Honda but Honda fails to teach their fiber cement porosity.

However, DeFord teaches that it is beneficial to obtain fiber cements according to their invention in order to obtain lighter weight and durable building products (0003-0017, 0077). As both Yonekawa and DeFord teach cements for building products and DeFord indicates their light cement being preferable, it would have been obvious to one having ordinary skill in the art at the time of invention to modify Yonekawa to include the cement of DeFord in order to obtain a light and durable building product.

DeFord's cement is substantially core with fiber skins thereon and DeFord's product is expected to have a porosity of at or about 10 to 90% for the reasons above. This range overlaps applicants' range and it would have been obvious to one having ordinary skill to choose any porosity In the above range to obtain desired cement weight.

Regarding claims 104 and 105: DeFord does not explicitly teach the density of the overall cement which is now within Yonekawa, but DeFord is teaches that the main goal of the cement is to obtain a light weight product with a density similar to lumber which is 0.38 to 0.9 (0006-0016). Therefore, one having ordinary skill would expect a density of 0.38 to 0.9 to be obtained in Yonekawa overlapping applicants' range. It would have been obvious to one having ordinary skill in the art at the time of invention to choose any density within the 0.38 to 0.9 range in order to obtain a suitable light weight cement.

In the instance the final product density is not necessarily in the above range, DeFord teaches that the density of a cement product can be adjusted using density

modifiers as desired (DeFord 0016, 0045, 0054, 0087) and that 0.38 to 0.9 density is beneficial for obtaining a light weight and durable cement product (DeFord 0006). Therefore, one having ordinary skill would know that density modifiers and amount thereof can be optimized to any value and through routine experimentation the desired density results can be obtained. It would have been obvious to one having ordinary skill in the art at the time of invention to modify Yonekawa to include and optimize density modifiers and amount thereof to any value in order to obtain a density of 0.38 to 0.9 and a light weight, durable cement product in. Again, this range overlaps applicants and it would have been obvious to one having ordinary skill in the art at the time of invention to choose any density within the 0.38 to 0.9 range in order to obtain a suitable light weight cement

7. Claims 111-113 and 114 are rejected under 35 U.S.C. 103(a) as being obvious over Yonekawa (JP 19931102) in view of DeFord (US Pub 2002/0139082).

Regarding claim 111: As maintained above, Yonekawa teaches a cement product including a first major surface with a reduced propensity for carbon dioxide wherein carbon dioxide is reduced by application of a carbon dioxide reducing sealer. Also, it was discussed that reducing carbon dioxide will reduce differential carbonation as carbon dioxide is needed for carbonation to occur. Therefore, the first major surface will have reduced propensity for carbonation and the reduction of carbonation is by a carbonation reducing sealer.

Yonekawa fails to teach the cement product being fiber reinforced cement and the product including cement to silica ratios and porosity as claimed. However, DeFord

teaches that it is beneficial to obtain fiber cements according to their invention, which include overlapping ratios and porosities to that claimed, in order to obtain lighter weight and durable building products. As Yonekawa and DeFord disclose analogous inventions related to cement products provided with weathering resistance and DeFord indicates their cement being beneficial, it would have been obvious to modify Yonekawa to include using the cement of DeFord in order to obtain a light weight and durable. Also, as the ratio of cement to silica and porosity of this product overlaps applicants, it would have been obvious to choose any content of cement, silica and porosity to obtain a desired cement.

Yonekawa fails to teach reducing carbonation by a separate keycoat but this is merely duplication of Yonekawa's sealer which would have been obvious as adding additional sealer on top of the already laid on increases thickness and/or coverage. It would have been obvious to one having ordinary skill in the art at the time of invention to modify Yonekawa to include multiple sealers in order to increase thickness and/or coverage. This multiple sealer will necessarily form at least a first sealer and a second sealer (keycoat) and as both are the same carbonation reducing sealer formulation above, the claim is met.

Regarding claim 112: Yonekawa fails to teach the curing processing as claimed. However, as discussed, DeFord teaches that it is beneficial that a layer to be applied is first partially cured, applied and then the final product is fully cured to enhance bonding. As the keycoat sealer is to be applied to the underlying sealer in Yonekawa and DeFord teaches that the above process is beneficial, one having ordinary skill at the time of

invention would have found it obvious to modify Yonekawa to include the keycoat being partially cured, applied and the fully cured to enhance bonding.

Regarding claim 113: Yonekawa fails to teach the sealer being applied to all surfaces of the product but this is merely duplication of the sealer which provides no patentable weight. One having ordinary skill would know that carbon dioxide prevention can be obtained on all surfaces by applying the sealer on all surfaces and this would be desirable for increasing weather resistance. Additionally, DeFord also teaches that weather resistant materials can be applied to all surfaces of a cement as desired (DeFord Figures 0112-0121). Therefore, it would have been obvious to one having ordinary skill at the time of invention to modify Yonekawa to include the sealer on all surfaces of the product to increase weather resistance.

Regarding claim 114: Yonekawa's sealer is acrylic and as this is the same as applicants' radiation curable sealer, Yonekawa's sealer is expected to having the property as claimed in claim 114.

Response to Arguments

1. Applicant's arguments regarding the 35 USC 112 rejection of claim 114 (see remarks pg 9, par. 6) filed January 4, 2011 has been considered but is not persuasive.

Applicants argue that claim 114 being rejected for dependency on claim 113 is inappropriate because one claim is allowed to depend from another. This is not persuasive because claim 114 was rejected for being dependent on an unclear claim 113 thereby, making claim 114 unclear due to dependency.

2. Applicant's arguments filed January 4, 2011 with respect to Honda not teaching claims 76, 78-83, 85-92, 94-99, 101-108 and 110 (see remarks pgs 10 all – pg 11 par 1 and 2, pg 12 par 4, pg 13 par. 1 and 2) have been considered but are moot in view of the new ground(s) of rejection.

However, applicant's arguments filed January 4, 2011 with respect to Honda in view of DeFord not teaching claims 111-114 are not persuasive.

Applicants argue on pg 13 par. 2 that Honda in combination with DeFord does not teach the claimed invention for the reasons provided in their previous remarks and there is no evidence the references teach each and every element in the claim. The examiner notes that these previous arguments are on pg 10 all – pg 11 par 1 and 2, pg 12 par 4 and Pg. 13, par. 1 of the remarks and are not persuasive and will be addressed to the extent in which they relate to claims 111-114.

a) In summary, applicants argue on pg 10 that Honda does not teach carbonation sealers. Honda only teaches an acrylic top coat on a top surface and a water repellent coating to the bottom surface of a product. While applicants agree that the water repellent coating will improve surface performance, Honda only measures freeze thaw performance and not actually carbonation. Applicants' argue that their invention provides more than just a water barrier by also controlling carbonation and there is no evidence provided by the Examiner or Honda that Honda's coating will be more than a mere water barrier (pgs 10 all).

This is not persuasive. The examiner gave clear evidence that both coatings will be considered carbonation reducing. Specifically, any material considered to cover and

form a barrier to environmental conditions on a surface would be considered to have some degree of carbonation reduction. For example, one having ordinary skill would know that carbon and carbonation would have to travel through said material in order to reach the surface and based on beers law, transmission of said carbonation would be decreased by material concentration. Therefore, the top coat and water barrier bottom coat are considered carbonation reducing even if they don't actually measure for carbonation. Additionally, Honda teaches that the sealers aid in prevention of carbonation (0003) making it carbonation reducing thereby clearly indicating them being carbonation reducing.

Further, applicants disclose that their sealer forming an interpenetrating network in a surface reduces carbonation. Honda does not explicitly disclose the sealers and surface interacting to form an inter-penetrating network. However, it is well known in the art that every material has some degree of porosity. As Honda applies their sealers to a cement, one having ordinary skill would expect that the sealers would at least penetrate (interact with) the cement to some extent thereby forming an inter-penetrating network. Additionally, Honda is teaching their fiber reinforced cement is made using an aqueous slurry comprising cement, filler, powder, etc. which is then dried (0017) and according to DeFord, fiber reinforced cement made similarly (DeFord 0037-0055) have at least some porosity large enough to be penetrated (DeFord 0100). Therefore, one having ordinary skill would reasonably expect Honda's sealers to penetrate (interact) with the cement board and form an inter-penetrating network into the cement. As the sealers will be considered to have the same characteristics as applicants', they are considered to have

the same capabilities of carbonation reduction and applicants have not provided any evidence to the contrary.

b) Applicants argue that the water barrier to the bottom surface is not at the thickness of 25-35 micron but instead, only the acrylic top coat has said thickness (Pg. 10, all). This is not persuasive because thickness is not claimed in claims 111-114. However, in the instance thickness is included for the coating of claim 111 in a future amendment, the examiner points out that claim 111 only requires a carbonation reducing coating on one surface. As above, the acrylic top coat is clearly shown and explained to be carbonation reducing on one surface and it has applicants' argued thickness.

c) Applicants argue that the examiner has provided no evidence that DeFord overcome the deficiencies of a carbonation reducing sealer having the thickness of Honda above (Pg. 11, par. 1, pg. 13, par. 2). This is not persuasive because DeFord was not used to cure the deficiencies of a carbonation reducing sealer and/or thickness within Honda for claims 111-114.

d) Applicants argue that Honda does not teach the sealer being cross-linked (par. 11 par. 2) but this is not persuasive as a cross-linked sealer is not claimed in claims 111-114.

e) Applicants argue that the Honda teaches a cement to silica ratio of 1.11 which is contrary to that claimed (Pg. 13, par. 1-2). This is not persuasive. In the previous and above office actions, Honda does not limit their composition to be the above ratio and Honda was modified to include DeFord's composition as DeFord teaches it to be

advantageously low weight, etc. as desired in the art and this content overlaps applicants'. Applicants have provided no valid arguments and/or evidence to show that the combination would not have been obvious.

3. Applicant's arguments filed January 4, 2011 with respect to DeFord not teaching claims 76, 78-81, 83-85, 88-89, 92, 95-109 and 110 (see remarks pgs 11, par. 2-3-pg. 12, par. 1-3 and pg 13 par. 3) have been considered but are moot in view of the new ground(s) of rejection. New grounds of rejection were necessitated by the newly added limitation of the sealers on both surfaces being cross-linked. DeFord does not teach cross-linking.

However, applicant's arguments filed January 4, 2011 with respect to DeFord not teaching claims 111-114 are not persuasive.

Applicants argue on pg 13 par. 3 that DeFord does not teach the claimed invention for the reasons provided in their previous remarks and cannot be used for obviousness of claims 111-114. The examiner notes that these previous arguments are on pgs 11, par. 2-3-pg. 12, par. 1-3 and pg 13 par. 3 of the remarks and are not persuasive and will be addressed to the extent in which they relate to claims 111-114.

a) Applicants argue that Honda does not teach the sealer being cross-linked (par. 11 par. 2) but this is not persuasive as a cross-linked sealer is not claimed in claims 111-114.

b) Applicants argue that the facing has a thickness of 1727 microns and not 15 microns (pg. 11, par. 3). This is not persuasive because thickness is not claimed in claims 111-114.

c) In summary, applicants argue that DeFord's facing is not the same as a sealer. Specifically, DeFord's facing of Table 1 is cement and it is know that cement undergoes carbonation as discussed in applicants' own specification. Therefore, the facing will undergo carbonation, not reduce carbonation and therefore, teach away from the claimed invention (pg. 11, par. 3, pg 12, par. 1-2, pg. 13, par. 3).

Applicants also argue that although the examiner points to DeFord's facing interpenetrating a cement surface, DeFord's facing is cement and as all cement undergoes carbonation, all of DeFord's facings will undergo carbonation. This cement to cement is contrary to the claim and therefore, arguing interpenetration is not sufficient (pg. 11, par. 3, pg. 12, par. 3)

This is not persuasive. Arguing that all cement undergoes carbonation is merely attorney argument with no evidence to support such conclusions. Specifically, applicants have not provided sufficient evidence to indicate that DeFord's cement facing or that all cement undergoes carbonation. While applicants' might argue such a concept in their specification, their disclosure does not provide sufficient evidence to indicate that all cement undergoes carbonation and especially the one of the closest prior art of DeFord.

In the instant case, it was discussed that any material considered to cover and form a barrier to environmental conditions on a surface would be considered to have some degree of carbonation reduction. As this is what DeFord's cement facing does, one having ordinary skill would know that carbon and carbonation would have to travel through said material in order to reach the surface and based on beers law,

transmission of said carbonation would be decreased by cement concentration. Therefore, cement facings would be considered carbonation reducing.

Further, the examiner agrees that it was pointed out that applicants disclose their sealer forming an interpenetrating network in a surface reduces carbonation. As DeFord teaches their facing and surface forming an interpenetrating network, one having ordinary skill would reasonably expect DeFord's facing to reduce carbonation as claimed. While applicants argue that the interpenetrating of facing cement and surface is not sufficient to meet the claim because cement undergoes carbonation, this is still attorney argument and applicants have not provided any evidence to support their conclusion or show that the interpenetrating network of DeFord would not obtain reduced carbonation.

d) Applicants argue that the facing has a thickness of 1727 microns and not 15 microns (pg. 11, par. 3). This is not persuasive because thickness is not claimed in claims 111-114.

4. Applicant's arguments filed January 4, 2011 with respect to Yonekawa in view of Honda not teaching claims 76-84, 86-88, 92-100, 106-109 and 110 are not persuasive.

Applicants argue that Yonekawa fails to teach the invention and/or provide obviousness (Pg. 12. par. 2) and Honda fails to teach similar teaching for reasons provided above.

Honda failing to teach similar teaching for applicants' above reasons are not persuasive for the same reasons the examiner provided previously.

Applicants provide the following arguments for Yonekawa failing to teach or provide obviousness.

a) Applicants argue that Yonekawa teaches a coating on cement mortar and not fiber reinforced cement (pg. 13, last par., pg. 14, par. 1).

This is not persuasive. It was discussed in the previous and above office actions that Yonekawa does not limit their substrate to be cement mortar. As Honda teaches benefits of using fiber reinforced cement, one having ordinary skill at the time of invention would have found it obvious to use Honda's substrate in place of the cement mortar for beneficial results.

b) Applicants argue that Yonekawa's coating is a mixture of an acrylic polymer and silicon monomer which is not the same as applicants' sealer (pg. 14, par. 1).

This is not persuasive. Applicants only claim their sealer being a cross-linked, radiation curable and carbonation reducing material but the claim does not exclude a sealer made from materials within Yonekawa. In contrast, Yonekawa's coating only has to meet the characteristics of being a cross-linked, radiation curable and carbonation reducing sealer to meet the claim.

In the instant case, it was discussed in the previous and above office actions that Yonekawa teaches an acrylic sealer (0011-0012) and as this is what applicants disclose as a radiation curable sealer, Yonekawa's sealer is considered to be radiation curable. Additionally, Yonekawa does teach the sealer reacting and becoming polymerized (0008, 0026-0028) which is known in the art as cross-linking. Therefore, Yonekawa's sealer is a cross-linked, radiation curable sealer.

Regarding the sealer being carbonation reducing, it was discussed in the previous and above actions that Yonekawa does not explicitly teach the sealer being "carbonation reducing'. However, as the material forms seal and blocks environmental conditions from reaching another material, it would be expected to have some degree of carbonation reduction for reasons above. Additionally, Yonekawa teaches the sealer including acrylic resins (0011) which the same as applicants' carbonation reducing sealer material and would therefore, be considered to have the same results. Also, Applicants disclose that the sealer forming an inter-penetrating network results in carbonation reduction and Yonekawa teaches such an interpenetrating network in par. 0008. Therefore, again, Yonekawa's sealer is considered to be carbonation reducing. Further, the examiner also points out that Yonekawa teaches the sealer is a neutralization and carbon dioxide reducing sealer (0004, 0009, examples) and it is known that without carbon dioxide, there will be no carbonation clearly evidenced by Honda (Honda 0003). Therefore, Yonekawa's sealer reducing carbon dioxide will result in the sealer being a carbonation reducing sealer.

For the above reasons, Yonekawa's cross-linked, radiation curable sealer is considered to be a cross-linked, radiation curable carbonation reducing sealer.

c) Applicants argue that Yonekawa does not say nor is there evidence that the coating is radiation curable.(pg. 14, par. 1).

This is not persuasive. The limitation of the coating being radiation curable does not actually require it to be cured by radiation. Instead, the limitation only requires the sealer to be capable of being cured by radiation. As above, the examiner clearly

indicated and provided evidence in the office actions that because Yonekawa's sealer is an acrylic sealer and applicants disclose acrylic to be radiation curable, Yonekawa's sealer is considered to meet the limitation. As applicants have not provided any evidence to the contrary, the rejection still applies.

d) Applicants argue that Yonekawa does not say nor is there evidence that the coating interacts to form an inter-penetrating network extending into the surface of cement.(pg. 14, par. 1).

This is not persuasive. Yonekawa clearly teaches in paragraph 0008 that the coating interacts to form an inter-penetrating network deep into the surface of cement.

e) Applicants argue that the examiner discusses Yonekawa's paragraph 0004 and 0009 as suggesting the coating being a carbon reducing sealer. However, applicants' point to Yonekawa's paragraph 0004 that the coating is a silicone oil or polysiloxane water repellent which may offer some preventive effect but it does not last and this is different than a cross-linked, radiation curable carbonation reducing sealer as claimed (pg. 14, par. 1).

This is not persuasive. Although applicants point to Yonekawa's paragraph 0004 and argue that such preventive effects do not last, this is not persuasive. Regardless of whether the effect will last does not matter as long as it is carbonation reducing in any form as this is all the claim required. Also, this is not persuasive because applicants are pointing to only the discussion of prior art sealers that such preventive effects wont last and not Yonekawa's specific sealer. Specifically, paragraph 0009 which the examiner

relied upon clearly indicates that their sealer is excellent at blocking carbon dioxide (ie: carbon dioxide) and neutralization.

Additionally, Yonekawa's sealer appears to be a cross-linked, radiation curable carbonation reducing sealer as claimed and as this is all that is being claimed, arguing that Yonekawa's sealer is different than applicants' is not persuasive.

f) Applicants argue that Yonekawa's paragraph 0009 teaches an acrylic polymer emulsion forms a film "on the surface" of concrete to block carbon dioxide and this teaches away from forming an interpenetrating network extending into the surface as claimed (pg. 14, par. 1).

This is not persuasive. Although Yonekawa's paragraph 0009 uses language of an emulsion film on the surface of the molding body, Yonekawa teaches that the film is made by allowing the emulsion to interact and form an interpenetrating network deep into the molding body in paragraph 0008. Therefore, regardless of Yonekawa using phrases including "on the surface", etc., this in no way excludes an interpenetrating network which is clearly taught.

5. Applicant's arguments filed January 4, 2011 with respect to Yonekawa in view of DeFord not teaching claims 111-114 (see remarks pg 15 last paragraph-pg. 16, all) are not persuasive.

Applicants argue that Yonekawa fails to teach the invention and/or provide obviousness as a whole for reasons above and DeFord has been shown to fail in a similar manner and teach away from the invention (Pg. 15, par. 3, pg. 16, par. 1).

Yonekawa failing to teach the invention based on applicants' above reasons are not persuasive for the same reasons the examiner provided previously.

DeFord failing to teach similar teachings and teach away from the invention based on applicants' above reasons are not persuasive for the same reasons the examiner provided previously.

Applicants also argue that the examiner has provided no evidence to how the combination can be used for obviousness against the claims. Specifically, applicants provide the following arguments.

a) Applicants argue that Yonekawa does not teach or suggest a fiber reinforced cement and makes no mention of a cement to silica ratio. (pg. 15, par. 3).

This is not persuasive. While Yonekawa does not teach or suggest a fiber reinforced cement or a cement to silica ratio, Yonekawa does not limit their cement to a specific type. As DeFord teaches their cement with overlapping cement to silica ratios provides a beneficial low weight product desired in the art, it would have been obvious to one having ordinary skill at the time of invention to include DeFord's fiber reinforced cement composition as Yonekawa's cement to obtain a beneficial low weight product.

b) Applicants argue that Yonekawa does not mention application of a keycoat or if its coating will operate with a keycoat (Pg. 15, par. 3).

This is not persuasive. While Yonekawa does not teach a key coat, the claim does not recite any keycoat composition nor does applicants' disclosure provide a specific definition for what is meant by keycoat. Therefore, any coating would be considered to be a key coat as claimed including a carbonation reducing coat.

In the instant case, because of the above reason, the claimed limitation of a key coat above a carbonation reducing coat would be met by merely duplication of parts of duplicating Yonekawa's carbonation reducing coating and as in the above and previous action, duplicating such a coating would have been obvious for more coverage, protection, etc.

While Yonekawa does not mention whether their coating will operate with a keycoat, Yonekawa does not teach that it cant. Also, as the keycoat in the above would be of the same material already suggested by Yonekawa to be suitable, one having ordinary skill would have reasonably expectation that such a keycoat can be used with the carbonation reducing coat. As applicants have not provided any evidence of unexpected results or that Yonekawa can not be modified in this manner, the rejection still applies.

c) Applicants argue that Yonekawa's coating is highly sensitive and requires a specific pH to prevent hydrolysis and fiber cement boards are generally considered to be highly alkaline and may have a pH above 9 which could affect hydrolysis.(pg. 15, par. 3).

It appears that applicants are arguing that one would not combine Yonekawa's coating with a fiber cement board because the pH of the cement could cause hydrolysis in the coating but this is not persuasive. The examiner notes that although applicants argue that fiber cement boards a "generally" highly alkaline and "may" have a pH above 9 and "could" affect hydrolysis is all not persuasive because this is merely attorney

argument with no evidence to support such conclusions. Specifically, there is no evidence that every fiber cement will have such a pH, etc.

However, the examiner also notes that the argument is not persuasive because Yonekawa specifically discloses that while the pH of the coating is held in a range of 5-9 to prevent hydrolysis of the monomer therein (0007, 0048), the monomer coating is still desirable hydrolyzed by the high alkalinity in the cement board (0008, 0049). Therefore, applicants arguing that you would not combine a high alkaline cement with the coating for reasons of possible hydrolysis is not persuasive as this is what is desired in Yonekawa.

d) Applicants argue against that one having ordinary skill would modify Yonekawa with the cement of DeFord to achieved the claimed results because there is no evidence that this is operable based on Yonekawa only teaching a film on the surface of cement and its ability to be hydrolyzed at an alkaline pH..(pg. 16, par. 1).

This is not persuasive because again, Yonekawa does not only teach a film on a cement surface but instead actually teaches it penetrating the surface. As DeFord teaches their cement being porous, one having ordinary skill would reasonably expect that the penetration desired in Yonekawa would still be operable. Additionally, again Yonekawa does not limit their cement to a specific type nor a specific pH and only teach that the cement should be alkaline to allow for hydrolysis. As DeFord clearly teaches their cement being alkaline, one having ordinary skill would reasonably expect that the hydrolysis desired in Yonekawa would still be operable. For these reasons, there is

nothing in either reference that would suggest that the combination would not be operable and as such, the rejections till applies.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAUREN ROBINSON whose telephone number is (571)270-3474. The examiner can normally be reached on Monday to Thursday 6am to 4pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jennifer McNeil can be reached on 571-272-1540. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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/LAUREN ROBINSON/
Examiner, Art Unit 1784

/Timothy M. Speer/
Primary Examiner, Art Unit 1784